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EXAMINER	
TSEGAYE, SABA	

ART UNIT	PAPER NUMBER
2662	10

DATE MAILED: 11/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/085,203	KWAK, JOSEPH A.	
	Examiner	Art Unit	
	Saba Tsegaye	2662	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 September 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. Claims 7, 8 and 10-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Schramm et al. (US 6,208,663).

Regarding claim 7, Schramm discloses, in Figs. 3 and 5, a physical automatic request repeat apparatus employed by a subscriber unit, comprising:

a transmitter having (RBS 22):

means for receiving data (a radio base stations 22);

means for formatting the received data into packets for transmission to the receiver, each packet having a particular encoding/data modulation (a radio base stations 22; column 5, lines 46-58);

means for transmitting the packets (column 5, lines 25-45);

means for retransmitting a packet, if an acknowledgment for that packet is not received (column 7, lines 39-53);

means for collecting retransmission statistics (column 7, lines 1-13); and

means for adjusting each particular data modulation using the collected retransmission statistics (column 7, lines 1-38); wherein if the collected retransmission statistics indicate a low number of retransmissions, a higher capacity encoding/data modulation scheme is selected as the particular encoding/data modulation and if the collected retransmission statistics indicate a high number of retransmissions, a lower capacity encoding/data modulation scheme is selected as the particular encoding/data modulation (column 7, line 1-column 8, line 22; claim 27); and

a receiver having (MS 12):

means for receiving packets (MS 12);

means for decoding and error checking each received packet (column 5, lines 46-column 6, line 11); and

means for generating an acknowledgment at the physical layer if that received packet has an acceptable error rate (column 7, lines 39-53).

Regarding claim 8, Schramm discloses the subscriber unit wherein the particular encoding/data modulation is forward error correction FEC encoding /data modulation (column 7, line 54-column 8, line 11).

Regarding claim 10, Schramm discloses the subscriber unit wherein the packets are transmitted using a single carrier with frequency domain equalization air interface (column 4, lines 49-56).

Regarding claim 11, Schramm discloses the subscriber unit wherein the acknowledgments are transmitted on the fast feedback channel using a CDMA air interface (column 4, lines 49-56).

Regarding claim 12, Schramm discloses the subscriber unit further comprising at the receiver for each received packet transmitting a negative acknowledgment, if that packet has an unacceptable error rate (column 7, lines 39-45).

Claim Rejections - 35 USC § 103

2. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schramm in view of Agee (US 6,128,276).

Schramm discloses all the claim limitations as stated above except for: the packets are transmitted using an OFDMA air interface in which frequency sub channels in an OFDMA set may be selectively nulled.

Agee teaches a radio communication method that is compatible with discrete multiple tone and orthogonal frequency-division multiplex-like frequency channelization techniques (column 4, line 19-column 5, line 40).

It would have been obvious to one ordinary skill in the art at the time of the invention was made to add a method that transmit packets using an OFDMA air interface, such as that suggested by Agee, in the method of Schramm in order to allow stationary and linear channel distortion to be modeled as an exactly multiplicative effect on the transmit spreading code.

3. Claims 1, 2, 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sipola (US 6,529,561) in view of Schramm et al. (US 6,208,663).

Regarding claim 1, Sipola discloses, in Figs. 2 and 5, a subscriber unit implementing physical layer automatic request comprising:

a transmitter having (260):

a physical layer transmitter for receiving data (270), formatting the received data into packets, each packet having a particular encoding/data modulation, transmitting the packets (202,

204) (column 10, lines 7-15; steps 500, 502), and retransmitting packets in response to not receiving a corresponding acknowledgment (234) for a given packet (column 10, lines 16-28;):

an ACK receiver for receiving the corresponding acknowledgment (step 510; column 7, line 60-column 8, line 3); and

a receiver having (264):

a physical layer receiver for demodulating (210) the packets (column 10, lines 29-40);

a combiner/decoder (222, 218) for buffering, decoding and detecting packet errors (step 516; column 21-50); and

an acknowledgment generator (224) for generating an acknowledgment for each packet, if that packet has an acceptable error rate (step 510; column 7, line 60-column 8, line 3).

However, However, Sipola does not expressly disclose collecting retransmission statistics and adjusting each particular encoding/data modulation using the collected retransmission statistics; if the collected retransmission statistics indicate a low number of retransmissions, a higher capacity encoding/data modulation scheme is selected as the particular encoding/data modulation and if the collected retransmission statistics indicate a high number of retransmissions, a lower capacity encoding/data modulation scheme is selected as the particular encoding/data modulation (as in claim 1); and a CDMA air interface (as in claim 5).

Schramm teaches that the radio base station RBS 22 counts the number of requests for retransmitted blocks and use alternative FEC coding and/or modulation scheme **((low level modulation, in this case QPSK modulation)** when the counted number of erroneously

transmitted blocks exceeds some predetermined threshold (column 7, line 1-column 8, line 22; claim 27).

It would have been obvious to one ordinary skill in the art at the time of the invention was made add a collecting retransmission statistics method, such as that suggested by Schramm, in the method of Sipola in order to reduce the probability that the retransmitted block is received erroneously and improve overall system performance (column 4, lines 3-11).

Regarding claim 5, Schramm teaches an ARQ techniques use an alternative modulation/coding scheme using FDMA and CDMA air interface.

It would have been obvious to one ordinary skill in the art at the time of the invention was made to use CDMA, such as that suggested by Schramm, in the radio transmission system of Sipola in order to minimize interference and to increase the capacity data throughput.

Regarding claim 2, Sipola discloses the subscriber unit wherein the particular encoding/data modulation is forward error correction FEC (column 2, line 29-37).

Regarding claim 6, Sipola discloses the subscriber unit whereby the acknowledgment generator transmits a negative acknowledgment, if any packet has an unacceptable error rate (column 7, line 60-column 8, line 3).

4. Claims 13-15 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haartsen (US 6,021,124) in view of Schramm et al. ('663).

Regarding claim 13, Haartsen discloses, in Fig. 3, a network using a multi-channel ARQ method transmits data packets from a source 16 to a destination 18 over a communication link that is subdivided into a number of channels. Further, Haartsen, Fig. 4, discloses a MUX 22 (claimed a sequencer), a FIFO 28 (claimed n transmitters transmitting to their associated n receivers), a FIFO 29 (claimed n receivers for receiving return packets through the data channel), and a DE-MUX 26 (claimed n hybrid ARQ decoders, each coupled with one of the n receivers). Further, Haartsen describes that the network halts the multiplexing of new data packets at the source during a subsequent multiplexing round until the destination positively acknowledges successful reception of a data packet and retransmit the data packets if no acknowledgement is received from the destination after a predefined time-out period.

However, Haartsen does not expressly disclose that the communication system collecting retransmission statistics and adjusting a particular encoding/data modulation for each of the N transmitter using the collected retransmission statistics; if the collected retransmission statistics indicate a low number of retransmissions, a higher capacity encoding/data modulation scheme is selected as the particular encoding/data modulation and if the collected retransmission statistics indicate a high number of retransmissions, a lower capacity encoding/data modulation scheme is selected as the particular encoding/data modulation.

Schramm teaches a communication system that supports multiple modulation/coding schemes. When connection quality drops and a number of negative acknowledgement signals exceed a predetermined threshold, ARQ techniques use an alternative modulation/coding

scheme. Further, Schramm teaches that if desired, the alternative FEC coding and /or modulation scheme can be implemented each time a retransmitted block is requested.

Therefore, it would have been obvious to one ordinary skill in the art at the time of the invention was made to add a system that collects retransmission statistics and adjusting a particular encoding/data modulation for each of the N transmitter using the colleted retransmission statistics, such as that suggested by Schramm, in the system of Haartsen in order to use FEC coding that provides increased protection and/or lower level modulation to reduce the probability that the retransmitted block is received erroneously and improve overall system performance (column 4, lines 3-11).

Regarding claim 14, Haartsen discloses the subscriber unit wherein the n signal transmitters (a FIFO 28) each temporarily store a packet that has been transmitted in a buffer memory (column 7, lines 45-64); and

whereby each of the n transmitters (a FIFO 28) clear the stored packet in readiness for receipt of another block when an acknowledge signal for the stored packet has been received at one of the n receivers (a FIFO 29) (column 7, lines 45-64).

Regarding claim 15, Haartsen discloses the subscriber unit wherein the n transmitters (a FIFO 28) each temporarily store a packet that has been transmitted in a buffer memory; (column 7, lines 45-64); and

whereby the n transmitters (a FIFO 28) retransmits the packet temporarily stored in its buffer memory when an acknowledgement signal for the stored packet has not been received at one of the n receivers (a FIFO 29) (column 8, lines 1-11).

Regarding claims 21 and 22, Haartsen discloses the subscriber unit wherein packets are transmitted using an orthogonal frequency division multiple access air interface in which frequency sub channels in an OFDMA set may be selectively mulled (column 10, lines 40-47).

Regarding claim 23, Haartsen discloses the subscriber unit wherein the acknowledgments are transmitted on a fast feedback channel using a CDMA air interface (column 9, lines 18-21).

5. Claims 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haartsen in view of Schramm as applied to claim 13 above, and further in view of Sipola (US 6,529,561).

Haartsen in view of Schramm discloses all the claim limitations as stated above except for: receivers requiring a retransmission combines a retransmitted packet with an original transmitted packet to facilitate error correction (as in claims 18 and 20); and a transmitter failing to receive an acknowledge signal from an associated decoder encodes that packet employing a different encoding technique from an encoding technique employed in an original transmission of that packet (as in claim 19).

Regarding claims 18 and 20, Sipola discloses a receiver (264) that comprises means (222) for combining a received coded data block punctured by the first puncturing pattern and a received coded data block punctured by the second puncturing pattern.

It would have been obvious to one ordinary skill in the art at the time of the invention was made to add a combiner, such as that suggested by Sipola, in the receiver of Haartsen in view of Schramm in order to provide a sufficient dense rage of effective code rates to enable the code rate required by the channel conditions to be selected relatively accurately, which saves the valuable radio resource of the system (column 4, lines 26-30).

Regarding claim 19, Sipola teaches that the channel coder increases the code rate of the coded data block to be retransmitted by puncturing the coded data block coded by the channel coding of the original transmission by using a second puncturing pattern (column 3, lines 51-65).

It would have been obvious to one ordinary skill in the art at the time of the invention was made add a method that uses a different encoding technique when a transmitter failing to receive an acknowledge signal, such as that suggested by Sipola, in the encoding system of Haartsen in view of Schramm in order to reduce the probability that the retransmitted block is received erroneously and improve overall system performance.

6. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haartsen in view of Schramm as applied to claim 13 above, and further in view of Yonge, III et al. (US 6,522,650).

Haartsen in view of Schramm discloses all the claim limitations as stated above except for each of the n transmitters clears its buffer memory if an acknowledge signal is not received after a maximum number of retransmissions (as in claim 16) and the maximum number of retransmissions is an operator defined integer having a range from 1 to 8 (as in claim 17).

Yonge illustrates, in Figs. 23 and 24, flow diagrams of a response resolve process performed by the frame transmit process of TX handler. Further, Yonge teaches that the process 444 determines if the NACK-count is greater than the NACK-count threshold (in this example, a threshold of 4). If the NACK-count is determined to be greater then the threshold of 4, then the frame is discarded (column 26, line 60-column 27, line 41).

It would have been obvious to one ordinary skill in the art at the time of the invention was made to add a retransmission counter and a maximum number of retransmissions (1 to 8), such as that suggested by Yonge, in the transmitter (FIFO) of Haartsen in view of Schramm in order to avoid overflow.

7. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sipola in view of Schramm et al. as applied to claim 1 above, and further in view of Agee.

Sipola in view of Schramm et al. discloses all the claim limitations as stated above except for: the packets are transmitted using an OFDMA air interface (as in claim 3); and frequency domain equalization (as in claim 4). — col 12, 30-36

Agee teaches a radio communication method that is compatible with discrete multiple tone and orthogonal frequency-division multiplex-like frequency channelization techniques (column 4, line19-column 5, line 40).

It would have been obvious to one ordinary skill in the art at the time of the invention was made to add a method that transmit packets using an OFDMA air interface, such as that suggested by Agee, in the method of Sipola in view of Schramm in order to allow stationary and

linear channel distortion to be modeled as an exactly multiplicative effect on the transmit spreading code.

Response to Arguments

8. Applicant's arguments filed 9/2/03 have been fully considered but they are not persuasive. Applicant argues (Remarks pages 10-11) that Schramm does not disclose increasing of the channel capacity in view of low retransmissions statistics. The Examiner respectfully disagrees with Applicant's contention. The Schramm reference clearly discloses that when connection quality drops and a number of negative acknowledgement signals exceed a predetermined threshold, ARQ techniques use an alternative modulation/coding scheme **(low level modulation, in this case QPSK modulation; if a number of negative acknowledgement signals does not exceed a predetermined threshold ARQ techniques use a high level modulation, in this case 16QAM)**. Each erroneously received block is sufficient to trigger a selection of a new modulation scheme; the selecting entity can base the selection of a particular FEC coding/modulation scheme based upon an evaluation of the current system and/or channel characteristics. Further, Schramm teaches that if desired, the alternative FEC coding and /or modulation scheme can be implemented each time a retransmitted block is requested.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Saba Tsegaye whose telephone number is (703) 308-4754. The examiner can normally be reached on Monday-Friday (7:30-5:00), First Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on (703) 305-4744. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.

ST
November 7, 2003

HASSAN KIZOU
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